

DSN OPERATIONS COSTS REDUCTIONS

The NASA Deep Space Network (DSN), managed by the Jet Propulsion Laboratory in Pasadena, California will experience dramatic funding reductions over the next five years in an environment of increased workload.

A team was formed and chartered to reengineer the DSN Operations processes to provide a 100 percent efficiency increase while reducing the overall budget by over 10 percent.

The Reengineering Team (RET) used reengineering techniques¹ to redesign two major processes of the DSN Operations data services process.

The two major processes that were reengineered are the Data Capture and Activity Planning process.

Data Capture is the process that provides telecommunications, tracking and data services to customers. The key functions provided by Data Capture are Data Delivery and Monitor and Control. Data Delivery provides the connections between customers and their targets. Monitor and Control ensures that services are performed correctly and that the quality is adequate to provide the committed data delivery.

Activity Planning is the process that generates and consolidates the support data that is required by the Data Capture process to provide services to customers. The support data allows the Data Capture process to operate in a predictive mode and thereby provide highly reliable services while operating under very tight performance tolerances. The functions performed by the Activity Plan process are identification of the services to be provided (Service Plan) and generation of the support data (Predicts) required to operate the systems while providing the services.

Key elements of the reengineered designs of the Data Capture and Activity Plan processes are Connection Operations, standard and tailored services, central operations consolidation, 1:1 (in time) vs. IC (in case) predicts generation and a wide area network (WAN.)

The new Data Capture system is built around a connections-oriented operations concept as opposed to the present facilities-oriented approach. The Connection Operations function configures and controls equipment, and establishes and verifies connections from the station to the customer. The Connection Operator performs all the functions required in a real-time activity, including real-time inputs from and *warm fuzzy feeling* to the customer.

The new Data Capture system provides both standard and tailored services. Standard services simplify the mission interface, increase operational efficiency (leading to reduced DSN costs) and allow automation of these services through the usage of TDNs (Temporal Dependency Networks.) The Connection Operator will continue to provide tailored services in response to requested non-standard services as an essential aspect of future operations support.

The reengineered Data Capture system reduces and/or replaces most of the DSN Network Operations Control Center (NOCC). Hardware maintenance budgets for central operations will be significantly reduced because older equipment will be replaced with more easily maintained products. These activities will be located in a single work area with considerably smaller total work space, thereby reducing facilities requirements at the JPL.

¹Mike Hammer and James Champy, "Reengineering the Corporation," HarperCollins, New York, NY. 1993

Using IT predicts is central to the new Activity Plan process design. Currently the generation of support data for the DSN requires advance delivery of products, typically from immature inputs, with additional contingency or IC deliveries. In the new, more rapid and efficient IT system, predictions generation will be based on up-to-date requirements, resulting in timely and more accurate predictions. Furthermore, last minute prediction change requests will be efficiently handled, resulting in a more responsive system.

The RET design provides for a conservative evolution to an automated, fault-tolerant, unattended network, as subsystems become adequately reliable and autonomous. Technological and eco-political considerations will all play a role in the evolution to increased automation.

The transition plan from today to the end-state of the RET's reengineered Data Capture and Activity Plan processes will be accomplished over several years with savings realized each year of the implementation, providing early payback of implementation costs.

The additive costs to implement the Data Capture and Activity Plan processes is about \$16M spread over three years (FY95-FY97.)

The cumulative savings realized by the reengineered processes are \$35M over the next five years (FY96-FY00) with an additional \$10.5M per year thereafter.

The payback of all implementation costs is within 2 years of the expenditure of the implementation funds. Operations funding requirements will be reduced by approximately \$10.5M per year starting in 2001. This represents a greater than 50 percent reduction in Data Capture and Activity Plan costs in FY99 and beyond or a 13 percent cost reduction in the total DSN operations Program.

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